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SKIN TREATING APPLIANCE

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No. OF CLAIMS 8

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1 This is a divisional application of Canadian Serial No. 199,340,
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In our present affluent society, a vast amount of money is spent on cosmetics and means for maintaining or preserving the beauty and the condition of a person's complexion. Although expensive creams and lotions have long been available for skin treatment, there have been no appliances which have been specifically developed for the skin or complexion care. Various types of pads and cloths have been used by women to apply soaps and lotions to their skin by hand. Because of the absence of any suitable equipment, many women simply apply soaps and lotions to their face and
10 body using their hands or fingertips. Such an approach represents an unsatisfactory solution to the skin care problem since it is difficult for women of ordinary dexterity to apply soaps and lotions evenly and uniformly using the fingertips or some sort of pad or cloth.

With the development of small, efficient, permanent magnet motors, it has been possible to produce compact, portable appliances suitable for many purposes. Through the utilization of the recently developed nickel cadmium rechargeable batteries, it has been possible to provide such small appliances which may be used safely for personal grooming and under conditions in which they may be subjected to water or other liquids. An
20 outstanding example of one such appliance is the rechargeable battery operated electrical toothbrush which is in widespread use at the present time. Even as the toothbrush permits the user to perform a quicker and better cleaning job on the teeth, so a similar appliance is required to enable women to perform a better and more complete cleaning and treatment of their skin.

Summary of the Invention

The invention relates to an electrically operated skin treating appliance having a rechargeable battery operated motor enclosed within



1 a power handle which is arranged to drive a skin treating brush or
massaging instrument through an elliptical orbit in a single plane. The
motor is arranged at one end of the power handle and is drivingly related
to a pivotally mounted lever which extends from the other end of the power
handle. The portion of the drive lever between the motor and the pivot
straddles the rechargeable battery, and the housing of the power handle
extends beyond the pivoted mounting to substantially enclose the implement
mounting end of the lever.

The switch for operating the motor is arranged to be actuated
10 when a lateral pressure is applied to the implement supporting shaft or
lever. This actuation is accomplished by means of supporting the lever
or shaft bearing in a spring biased carrier which may be moved between
a switch open and a switch closing position when the aforementioned lateral
of force is applied to the end of the implement supporting shaft.

As a means of avoiding actuation of the switch when skin treating
implements are applied to or removed from the shaft, a simple button
having a shaft restraining portion is provided in the housing. This button
permits the shaft to be restrained against displacement during the time in
which brushes or massage heads are applied to the appliance. This
20 button is such that it may be displaced to the inoperative position simply
by applying a substantial force to the skin treating implement or by moving
the button by hand to a non-restraining position.

The skin treating implement itself is provided with a skirt which
cooperates with a flange on the housing or power handle extension in a
manner to limit or restrict the accumulation of dirt or other deposits in
the unsealed portions of the appliance. The appliance itself is completely
sealed to provide a liquid tight enclosure for the motor and battery. Re-
charging is accomplished by means of induction charging with the

1 Further objects of the present invention will become apparent as the following specification proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Brief Description of the Drawings

For a better understanding of the present invention reference may be had to the accompanying drawings in which:

Fig. 1 is a perspective view of a new and improved electrically operated skin treating appliance embodying the principles of the present invention;

Fig. 2 is a vertical sectional view taken substantially through the vertical axis of the power handle of the appliance shown in Fig. 1;

Fig. 3 is an exploded perspective view of the internal mechanism of the appliance shown in Figs. 1 and 2;

Fig. 4 is an enlarged fragmentary sectional view of the drive mechanism which is also shown in Fig. 2;

Fig. 5 is a sectional view taken substantially on line 5-5 of Fig. 4;

Fig. 6 is an enlarged sectional view taken on line 6-6 of Fig. 4;

Fig. 7 is a fragmentary sectional view taken on line 7-7 of Fig. 6;

Fig. 8 is a fragmentary sectional view taken on line 8-8 of Fig. 6;

Fig. 9 is a fragmentary sectional view taken on line 9-9 of Fig. 6;

Fig. 10 is an enlarged sectional view taken substantially along line 10-10 of Fig. 1;

Fig. 11 is a sectional view similar to Fig. 10 but with the control button shown in the off position;

Fig. 12 is a fragmentary sectional view taken on line 12-12 of Fig. 11 assuming that Fig. 11 shows the complete housing;

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1 elliptical shape of the brush itself. For the purpose of illustration, a dotted line showing of the shape of the orbit is included in Fig. 1.

In order to provide a satisfactory power handle for producing the orbital motion of the treating implement 26, it is necessary to arrange the implement drive means so that the reaction to the motion producing means will not cause the power handle 22 to oscillate rather than the implement 26. This result requires a particular design of the power transmitting shaft and arrangement of the driving elements as will be more specifically described below.

10 The power handle 22 as best shown in Fig. 2 includes an elongated housing 32 which is formed by a generally cylindrical tapered member 34 and a cup-shaped cap member 36. The housing member 34 is provided with a stepped flange 34a which cooperates with a flange 36a on the cap member 36 at their abutting edges to form an overlapping connection. A suitable cement or adhesive is applied in this area to seal the members 34 and 36 together in this area.

20 Within the sealed portion of the housing 32 is a rechargeable battery 38 and a low voltage direct current operated motor 40 which is adapted to operate from the battery 38. In order to visualize the manner in which the motor 40 and the battery 38 are interrelated, reference should be had to Figs. 3, 4, and 5 of the drawings. The motor 40 includes a cup-shaped housing 42 which is closed by means of a gear supporting frame 44. Joined to the gear supporting frame 44 and extending outwardly therefrom is a channel-shaped battery support 46 which at its outer end is joined to a forward bearing support 48. Battery support 46 is generally semi-cylindrical in shape and partially encloses the battery 38 as is shown in Figs. 3, 4, and 5. The portion of the support 46 extending from the battery enclosing area to the supporting frame 44 includes three legs or struts 46a, 46b, and 46c. The outer legs 46a and 46b are notched at 46d and 46e so

1 portion 60c which slides between the projection 44d and a guide wall 44e. The guide 60c in its sliding engagement with the frame 44 assures adequate support for the inner end of the lever 54 as force or pressure is applied to the skin treating implement 26. The gear member 52 and the co-operating follower 60 are made of a suitable plastic material which will have the necessary bearing qualities for such an application. In one constructed embodiment of the invention, an impregnated, nylon material was used.

10 The follower 60 is molded into the outer end of the shaft 54 with a clearance opening 60d being provided for the gear shaft 50 to extend therethrough.

The power transmitting lever or shaft 54 is made up for a forwardly extending rod portion 54a and a formed U-shaped portion 54b. The U-shaped portion 54b extends alongside of the battery 38 and serves to drivingly interconnect the gear member 52 with the rod portion 54a which is axially disposed within the power handle 22. The rod portion 54a is received in a bearing 62 which is positioned on the bearing support 48. In order to retain the bearing support 48 in assembled relationship with the battery support 46, the bearing support 48 is formed with integrally molded flanges 48a and 48b which snugly receive the forward end of the 20 battery support 46 which is the end remote from the motor 40. A third projection 48c on the bearing support 48 engages the interior of the semicylindrical battery support 46 to insure a rigid connection between the parts. The inward projections 48d on the flanges 48a and 48b snap behind projections 46g on the battery support to restrain the bearing support 48 against axial movement with respect to the battery support 46. The manner in which the projections 48a, 48b, and 48c interlock with the battery support 46 is best shown in Figs. 3, 5, and 6. This provides a simple and inexpensive means of assembling the supports 46 and 48 relying simply on the

1 engagement with the edges of the clearance opening 71 as is best shown
in Fig. 9. With the stop member 72 assembled to the bearing support 48,
the carrier 64 is mounted for a small amount of sliding movement in a
direction parallel to the slots 67 and 68.

The purpose of this limited movement is to actuate a switch 74
which is mounted on the inner face of the bearing support 48, as is clearly
shown in Figs. 6 and 7. The switch 74 consists of two L-shaped contact
members 75 and 76 which are mounted on the bearing support 48 by
means of rivets 77 with the free ends of the contact members 75 and 76
10 extending into an overlapping relationship, as is shown in Fig. 8.

Under normal conditions, when the carrier 64 is in its disen-
gaged position with respect to switch 74, the contact members 75 and 76 are
formed and mounted so that their overlapping ends are spaced apart, as
shown in Fig. 4. The carrier 64 is biased to this disengaged position by
means of a coil spring 78 which is positioned in the slot 67 and supported
on axially extending protuberances formed on the bearing support 48 and
the carrier 64. As shown in Figs. 4, 6, and 7, the spring 78 biases the
carrier 64 downwardly into engagement with the stop member 72. In this
position, the contact members 75 and 76 are spaced apart, and the switch
20 74 is, therefore, in its open position even though the carrier 64 is engaged
with the contact member 75. When a force is applied upwardly against the
outer or exposed end of the lever 54, as shown in Fig. 7 by an arrow, the
carrier 64 is urged upwardly in the slots 67 and 68 overcoming the biasing
force of the spring 78.

An actuating projection 79 on the T-shaped extension 66 of the
carrier 64 is in continuous engagement with the contact member 75, and
when the carrier 64 is urged upwardly, the projection 79 forces contact
member 75 upwardly into engagement with the contact member 76. Al-
though not shown in the drawings, suitable leads are provided to inter-

1 82a which is gripped between the bearing support 48 and the housing member
34 at shoulder 83, an intermediate thin-walled connecting portion 82b, and
an axially elongated hub portion 82c which engages the shaft 54a and is
received within a reduced diameter portion 84, as best shown in Fig. 4.
The gasket 82 is sufficiently resilient in the area of the intermediate
connecting portion 82b to permit limited axial and pivotal movement of
the shaft 54 in the bearing 62. The gasket 82 thus forms with the lower
two thirds of the cylindrical housing member 34 and the cap member 36
an enclosure for a sealed chamber 85 within which the motor 40 and the
10 battery 38 are positioned.

The upper portion of the housing member 34 extending from the
gasket 82 to the end opening 80 forms a protective shroud or covering for
the otherwise exposed end of the shaft 54. In addition, the outermost end
of the housing member 34 is formed with an upstanding flange 86 which
extends into an opening 87 formed in supporting shank 88 of the skin
treating implement 26. As is evident from the showing in Figs. 2 and
12 of the drawings, the overlapping relationship between the shank 88 and
the flange 86 provide an arrangement in which liquid is essentially pre-
vented from entering into the opening 80 because of the tortuous path it
20 must follow to accomplish such entry. Any liquid soap or cream which
runs down the shank 88 of the implement 26 tends to run off the bottom of
the shank onto the power handle 22 and has no tendency to move inwardly
over the flange 86 and into the interior of the housing member 34. This
provides a type of baffling which maintains the forward third of the housing
32 reasonably free of liquids thereby placing little demand on the sealing
functions provided by the gasket 82.

The outer end of the shaft 54 is formed with a flatted portion 90
and circumferential groove 91. The flatted portion 90 cooperated with a
correspondingly shaped opening or recess in the implement 26 to key the

1 shaft 54 without actuating the switch 74 as long as the restraining member 95 is in the position shown in Fig. 11. When it is desired to use the appliance 20 in treating the skin, the actuating button 98 is pushed rearwardly displacing the member 95 to the position shown in Fig. 10. In this position, the hole 100 provides sufficient clearance for the shaft 54 to be deflected to a position in which the switch 74 is closed thereby energizing the motor 40. In addition, the hole 100 provides sufficient lateral clearance so that the shaft portion 54a may move in a plane perpendicular to the direction of movement of the member 95 so as to cause the implement 26 to move in
 10 its orbital path. It should also be noted that the member may be displaced from its holding position as shown in Fig. 11 to the operating position as shown in Fig. 10 by merely applying sufficient force on shaft 54 to overcome the action of detent projections 101. In some instances, this approach may be more convenient than displacing member 95 by pushing actuating button 98.

It should be readily appreciated that as the lever 54 moves axially and pivots about the bearing 62, the forward portion 54a of the lever 54 pivots sufficiently to produce the three sixteenths lateral movement discussed above in connection with the orbit of the implement 26. The
 20 motor speed and reduction produced in the gear member 52 is such that the shaft 54 in one constructed embodiment oscillates or defines the orbital movement of the implement 26 at the rate of 1800 times per minute. Because of the speed and extent of this oscillation, it is desirable to have the forward portion 54a of the lever 54 enclosed within the housing member 34 so that it will not be in a position to strike or bruise sensitive areas of the face and head when the bristles 30 of the implement 26 are being applied to the face, neck, etc. In addition, by having the housing 22 made in an elongated form and extending all the way to the shank portion 88 of the implement 26, the user is given more latitude and freedom in the

1 110 to the container 109 with its frozen contents. This type of treatment is recommended to close the skin pores during various types of beauty treatment. The elliptical, orbital movement of the massage implement 105 increases the effectiveness of the cold treatment or conditioning of the skin. For simple massaging without heat or cold treatment, a third implement has been provided having the same shape as implement 105 but having a rubber cup rather than aluminum cup 110.

To permit the power handle 22 to be completely sealed against the entrance of moisture, charging means for recharging the battery 85 have
10 been employed which avoid the necessity for having any contacts or conductors extending through the walls of the power handle 22. These charging means involve the use of an induction coupling between an external charging circuit 113 enclosed in the charging stand 24 and an internal charging circuit 115 sealed within the power handle 22. The internal charging circuit 115 includes a secondary coil 116 of a charging transformer 117. The charging transformer 117 also includes a primary coil 118 which is positioned in the charging stand 24. As is best shown in Figs. 2 and 13, the secondary coil 116 is made up of a bobbin or core 119 of permeable material having its axis coextensive with the axis of the power
20 handle 22 and having windings 120 positioned thereon. The core or bobbin 119 comprises a cup-shaped upper member 119a which is formed of a magnetically permeable material and is secured to a lower circular wall 119b of the bobbin by a magnetically permeable hub 119c. The cup-shaped member 119a is formed with side walls 119d which are snugly received against the inside walls of the cap member 36. The upper edges of the side walls 119d engage a plastic spider 122 which in turn engages a retainer 121 and the motor 40. Both the spider 122 and retainer 121, which are best shown in Figs. 2 and 3, position the motor against lateral displacement and also retain the parts in their relative axial positions. The retainer 121

- 1 flux between the two coils of the transformer 117. The cap member 36 is made of minimum wall thickness in the area between the lower wall 119b of the core 119 and the cup-shaped member 127 which makes up part of the enclosure for the primary coil 118. In addition, the wall thickness of the cap member 36 is at a minimum in the area of the upstanding wall 119d of the core 119 and the adjacent wall 126c on the upper cup-shaped member 126 of the coil enclosure 125. This arrangement minimizes the reluctance in the gaps between the metallic flux conducting members associated with the primary and secondary coils of the transformer 117.
- 10 As a consequence, there is good coupling between the primary coil 118 and secondary coil 116. Thus, the charging of the battery 38 is accomplished by merely inserting the power handle 22 into the charging stand 24 where the primary and secondary of transformer 117 will be inductively coupled to supply a charging current in the internal charging circuit 115. The rectifier 123 provides a half wave charging current to the battery 38.

The housing portion of the charging stand 24 consists merely of two plastic molded parts, an upper housing member 24a, and a lower housing member 24b which are suitably secured together by assembly screws. In the assembled position, the upper housing member 24a has a
20 downwardly directed wall 24c which engages the coil enclosure 125 and clamps it against the lower housing member 24b. This provides a structurally simple and attractive charging stand which supports and cradles the power handle 22 and positions it so that the internal charging circuit 115 is inductively coupled to the external charging circuit 113 in order that the battery 38 may be charged.

While there has been shown and described several embodiments of the present invention, it will be understood that changes and modifications may occur to those skilled in the art and it is, therefore, contemplated by the appended claims to cover all such changes and modifications

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A skin treating appliance comprising an elongated housing suitable for being gripped in the hand of a user, a motor mounted within said housing at one end, an implement driving shaft extending from said housing at the other end thereof, gear means interconnecting said motor and shaft to reciprocate said shaft and to oscillate said shaft about a support bearing which engages said shaft intermediate its ends, a rechargeable battery supported in said housing between said motor and said bearing, said housing being sealed at the motor end thereof and unsealed at the end from which said implement shaft extends, intermediate sealing means within said housing adjacent said bearing providing a seal between said shaft and the interior of said housing thereby forming a sealed enclosure for said motor and battery.

2. The appliance of claim 1 wherein said housing is tapered toward an implement mounting end, a skin treating implement detachably supported with respect to said housing and having a shank which overlaps the tapered end of said housing, said driving shaft pivotally mounted intermediate its ends at said bearing and within said housing with the end of said shaft extending from said housing engaging said implement within said shank and the other end drivingly connected to said motor, and said lever being completely enclosed by said housing and said implement shank.

3. The appliance of claim 2 wherein said implement comprises a brush having bristles the free ends of which lie in a plane parallel to the axis of said shaft and which define an orbital area similar to the orbit through which said brush is driven by said shaft.

4. The appliance of claim 2 wherein said motor drives said shaft through gear and cam means which reciprocate said shaft along its axis and oscillates said shaft about said pivotal mounting, said reciprocation

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and oscillation of said lever causing said implement to move through an elliptical orbit, said implement comprising a brush having the bristles thereof arranged in an elliptical configuration similar to the orbit of movement of said implement.

5. The appliance of claim 2 wherein said implement includes a skin treating head carried on a short shank so that said head is supported closely adjacent the tapered end of said housing, said housing having a reduced diameter flange at the opening from which said shaft extends out of said housing, said shank having a flange which overlaps said housing flange but is spaced radially therefrom to permit said implement to move through an elliptical orbit.

6. The appliance of claim 2 wherein said shaft includes a rod portion which is axially disposed within said housing and extends through said pivotal mounting into connection with said implement, said shaft also including a connecting portion which extends from said rod portion into driving connection with said motor, said connecting portion being U-shaped and straddling said battery.

7. The appliance of claim 1 including a semicylindrical channel-shaped frame extending lengthwise in said housing and connected to said motor at one end and to a shaft bearing support at the other end, said battery being received within said frame between said motor and said bearing support, said shaft being carried by said bearing on said bearing support and being supported for pivotal and axial movement therein.

8. The appliance of claim 7 wherein said shaft is formed by a rod portion extending from said bearing to the protruding end, said rod portion being axially disposed within said housing, said shaft also including a displaced portion extending from the inner end of said rod portion adjacent said battery on the opposite side of said battery from said frame into driving connection with said motor.







